AMENDMENTS

In the Claims

1.**(canceled)**

2.**(canceled)**

3.**(canceled)**

4.**(canceled)**

5.**(canceled)**

6.**(canceled)**

7.**(canceled)**

8.**(canceled)**

9.**(canceled)**

10.**(currently amended)** A composition comprising a polymerizing agent including a molecular tag covalently bonded to a site on the polymerizing agent and a monomer including a molecular tag, where at least one of the tags has a fluorescence property that undergoes a change before, during and/or after each of a sequence of monomer incorporations due to an interaction between the polymerizing agent tag and the monomer tag and where the polymerizing agent lacks 3' to 5' exonuclease activity.

11.**(canceled)**

12.**(canceled)**

13.**(currently amended)** The composition of claim 10, wherein the polymerizing agent is a polymerase lacking 3' to 5' exonuclease activity or reverse transcriptase lacking 3' to 5' exonuclease activity.

14.**(currently amended)** The composition of claim 13, wherein the polymerase is selected from the group consisting of *Taq* DNA polymerase I lacking 3' to 5' exonuclease activity, T7 DNA polymerase lacking 3' to 5' exonuclease activity, Sequenase lacking 3' to 5' exonuclease activity, and the Klenow fragment from *E. coli* DNA polymerase I lacking 3' to 5' exonuclease activity.

15.(**currently amended**) The composition of claim 13, wherein the reverse transcriptase comprises HIV-1 reverse transcriptase lacking 3' to 5' exonuclease activity.

16.(**previously presented**) The composition of claim 10, wherein each of the monomers comprises a deoxynucleotide triphosphate (dNTP) and the monomer tag is covalently bonded to the β or γ phosphate group of each dNTP.

17.(**previously presented**) The composition of claim 10, wherein the tags comprise fluorescent tags and the fluorescence property comprises an intensity and/or frequency of emitted fluorescent light.

18.(**previously presented**) The composition of claim 17, wherein the fluorescence property is fluorescence resonance energy transfer (FRET) where either the monomer tag or the polymerase tag comprises a donor and the other tag comprises an acceptor and where FRET occurs when the two tags are in close proximity.

19.(**previously presented**) The composition of claim 14, wherein the polymerase comprises *Taq* DNA polymerase I having a tag attached to an amino acid at a specific amino acid position of the *Taq* DNA polymerase I, where the amino acid position is selected from the group consisting of 513-518, 643, 647, 649 and 653-661 of SEQ. ID No. 11, where the tag comprises a fluorescent molecule.

20.(**canceled**)

21.(**canceled**)

22.(**canceled**)

23.(**canceled**)

24.(**canceled**)

25.(**canceled**)

26.(**canceled**)

27.(**canceled**)

28.(**canceled**)

29.**(canceled)**

30.**(canceled)**

31.**(canceled)**

32.**(canceled)**

33.**(canceled)**

34.**(canceled)**

35.**(canceled)**

36.**(canceled)**

37.**(canceled)**

38.**(canceled)**

39.**(canceled)**

40.**(canceled)**

41.**(canceled)**

42.**(canceled)**

43.**(canceled)**

44.**(canceled)**

45.**(canceled)**

46.**(canceled)**

47.**(canceled)**

48.**(canceled)**

49.**(canceled)**

50.**(currently amended)** A composition comprising a polymerizing agent including a molecular tag covalently bonded to a site on the polymerizing agent and a deoxynucleotide triphosphate (dNTP) including a molecular tag covalently bonded to the β and/or γ phosphate group of the dNTP, where at least one of the tags has a fluorescence property that undergoes a change before, during and/or after each of a sequence of monomer incorporations due to an interaction between the polymerizing agent tag and the dNTP tag.

51.**(previously presented)** The composition of claim 50, wherein the polymerizing agent is a

polymerase or reverse transcriptase.

52.**(previously presented)** The composition of claim 51, wherein the polymerase is selected from the group consisting of *Taq* DNA polymerase I, T7 DNA polymerase, Sequenase, and the Klenow fragment from *E. coli* DNA polymerase I.

53.**(previously presented)** The composition of claim 51, wherein the reverse transcriptase comprises HIV-1 reverse transcriptase.

54.**(previously presented)** The composition of claim 50, wherein the tags comprise fluorescent tags and the fluorescence property comprises an intensity and/or frequency of emitted fluorescent light.

55.**(previously presented)** The composition of claim 54, wherein the fluorescence property is fluorescence resonance energy transfer (FRET) where either the monomer tag or the polymerase tag comprises a donor and the other tag comprises an acceptor and where FRET occurs when the two tags are in close proximity.

56.**(previously presented)** The composition of claim 52, wherein the polymerase comprises *Taq* DNA polymerase I having a tag attached to an amino acid at a specific amino acid position of the *Taq* DNA polymerase I, where the amino acid position is selected from the group consisting of 513-518, 643, 647, 649 and 653-661 of SEQ. ID No. 11, where the tag comprises a fluorescent molecule.

57.**(new)** A composition comprising a polymerizing agent including a molecular tag covalently bonded to a site on the polymerizing agent and a deoxynucleotide triphosphate (dNTP) including a molecular tag covalently bonded to the β phosphate group of the dNTP, where at least one of the tags has a fluorescence property that undergoes a change before, during and/or after each of a sequence of monomer incorporations due to an interaction between the polymerizing agent tag and the dNTP tag.

58.**(new)** The composition of claim 57, wherein the polymerizing agent is a polymerase or

reverse transcriptase.

59.(new) The composition of claim 58, wherein the polymerase is selected from the group consisting of *Taq* DNA polymerase I, T7 DNA polymerase, Sequenase, and the Klenow fragment from *E. coli* DNA polymerase I.

60.(new) The composition of claim 58, wherein the reverse transcriptase comprises HIV-1 reverse transcriptase.

61.(new) The composition of claim 57, wherein the tags comprise fluorescent tags and the fluorescence property comprises an intensity and/or frequency of emitted fluorescent light.

62.(new) The composition of claim 61, wherein the fluorescence property is fluorescence resonance energy transfer (FRET) where either the monomer tag or the polymerase tag comprises a donor and the other tag comprises an acceptor and where FRET occurs when the two tags are in close proximity.

63.(new) The composition of claim 59, wherein the polymerase comprises *Taq* DNA polymerase I having a tag attached to an amino acid at a specific amino acid position of the *Taq* DNA polymerase I, where the amino acid position is selected from the group consisting of 513-518, 643, 647, 649 and 653-661 of SEQ. ID No. 11, where the tag comprises a fluorescent molecule.

64.(new) A composition comprising a polymerizing agent including a molecular tag covalently bonded to a site on the polymerizing agent and a deoxynucleotide triphosphate (dNTP) including a molecular tag covalently bonded to the γ phosphate group of the dNTP, where at least one of the tags has a fluorescence property that undergoes a change before, during and/or after each of a sequence of monomer incorporations due to an interaction between the polymerizing agent tag and the dNTP tag.

65.(new) The composition of claim 64, wherein the polymerizing agent is a polymerase or reverse transcriptase.

66.(new) The composition of claim 65, wherein the polymerase is selected from the group consisting of *Taq* DNA polymerase I, T7 DNA polymerase, Sequenase, and the Klenow fragment from *E. coli* DNA polymerase I.

67.(new) The composition of claim 65, wherein the reverse transcriptase comprises HIV-1 reverse transcriptase.

68.(new) The composition of claim 64, wherein the tags comprise fluorescent tags and the fluorescence property comprises an intensity and/or frequency of emitted fluorescent light.

69.(new) The composition of claim 68, wherein the fluorescence property is fluorescence resonance energy transfer (FRET) where either the monomer tag or the polymerase tag comprises a donor and the other tag comprises an acceptor and where FRET occurs when the two tags are in close proximity.

70.(new) The composition of claim 66, wherein the polymerase comprises *Taq* DNA polymerase I having a tag attached to an amino acid at a specific amino acid position of the *Taq* DNA polymerase I, where the amino acid position is selected from the group consisting of 513-518, 643, 647, 649 and 653-661 of SEQ. ID No. 11, where the tag comprises a fluorescent molecule.

71.(new) A composition comprising a polymerizing agent including a molecular tag covalently bonded to a site on the polymerizing agent and a monomer including a molecular tag covalently bonded to the terminal phosphate of the monomer, where at least one of the tags has a fluorescence property that undergoes a change before, during and/or after each of a sequence of monomer incorporations due to an interaction between the polymerizing agent tag and the monomer tag.

72.(new) The composition of claim 71, wherein the polymerizing agent is a polymerase or reverse transcriptase.

73.(new) The composition of claim 72, wherein the polymerase is selected from the group

consisting of *Taq* DNA polymerase I, T7 DNA polymerase, Sequenase, and the Klenow fragment from *E. coli* DNA polymerase I.

74.**(new)** The composition of claim 72, wherein the reverse transcriptase comprises HIV-1 reverse transcriptase.

75.**(new)** The composition of claim 71, wherein each of the monomers comprises a deoxynucleotide triphosphate (dNTP) and the monomer tag is covalently bonded to the terminal phosphate group of each dNTP.

76.**(new)** The composition of claim 75, wherein the tags comprise fluorescent tags and the fluorescence property comprises an intensity and/or frequency of emitted fluorescent light.

77.**(new)** The composition of claim 76, wherein the fluorescence property is fluorescence resonance energy transfer (FRET) where either the monomer tag or the polymerase tag comprises a donor and the other tag comprises an acceptor and where FRET occurs when the two tags are in close proximity.

78.**(new)** The composition of claim 73, wherein the polymerase comprises *Taq* DNA polymerase I having a tag attached to an amino acid at a specific amino acid position of the *Taq* DNA polymerase I, where the amino acid position is selected from the group consisting of 513-518, 643, 647, 649 and 653-661 of SEQ. ID No. 11, where the tag comprises a fluorescent molecule.

79.**(new)** A composition comprising a polymerizing agent including a molecular tag covalently bonded to a site on the polymerizing agent lacking 3' to 5' exonuclease activity and a monomer including a molecular tag, where at least one of the tags has a fluorescence property that undergoes a change before, during and/or after each of a sequence of monomer incorporations due to an interaction between the polymerizing agent tag and the monomer tag and where the site comprises a naturally occurring cysteine site or a cysteine replacement site in the polymerizing agent selected so that the site is less than or equal to about 25Å from a tag on each incorporating monomer regions and are not sites having structural/functional importance to proper functioning of the polymerizing

agent and is covalently bonded to the cysteine through its SH group.

80.(new) The composition of claim 79, wherein the site is less than or equal to about 15Å from a tag on each incorporating monomer.

81.(new) The composition of claim 79, wherein the site is less than or equal to about 10Å from a tag on each incorporating monomer.

82.(new) The composition of claim 79, wherein the polymerizing agent is a polymerase or reverse transcriptase.

83.(new) The composition of claim 79, wherein the polymerase is selected from the group consisting of *Taq* DNA polymerase I, T7 DNA polymerase, Sequenase, and the Klenow fragment from *E. coli* DNA polymerase I.

84.(new) The composition of claim 83, wherein the reverse transcriptase comprises HIV-1 reverse transcriptase.

85.(new) The composition of claim 79, wherein each of the monomers comprises a deoxynucleotide triphosphate (dNTP) and the monomer tag is covalently bonded to the β and/or γ phosphate group of each dNTP.

86.(new) The composition of claim 85, wherein the tags comprise fluorescent tags and the fluorescence property comprises an intensity and/or frequency of emitted fluorescent light.

87.(new) The composition of claim 86, wherein the fluorescence property is fluorescence resonance energy transfer (FRET) where either the monomer tag or the polymerase tag comprises a donor and the other tag comprises an acceptor and where FRET occurs when the two tags are in close proximity.

88.(new) The composition of claim 83, wherein the polymerase comprises *Taq* DNA

polymerase I having a tag attached to an amino acid at a specific amino acid position of the *Taq* DNA polymerase I, where the amino acid position is selected from the group consisting of 513-518, 643, 647, 649 and 653-661 of SEQ. ID No. 11, where the tag comprises a fluorescent molecule.

89.(new) A composition comprising a polymerizing agent including a molecular tag covalently bonded to a site on the polymerizing agent and a monomer including a molecular tag covalently bonded to the terminal phosphate of the monomer, where at least one of the tags has a fluorescence property that undergoes a change before, during and/or after each of a sequence of monomer incorporations due to an interaction between the polymerizing agent tag and the monomer tag and where the site comprises a naturally occurring cysteine site or a cysteine replacement site in the polymerizing agent selected so that the site is less than or equal to about 25Å from a tag on each incorporating monomer and is covalently bonded to the cysteine through its SH group.

90.(new) The composition of claim 89, wherein the site is less than or equal to about 15Å from a tag on each incorporating monomer.

91.(new) The composition of claim 89, wherein the site is less than or equal to about 10Å from a tag on each incorporating monomer.

92.(new) The composition of claim 89, wherein the polymerizing agent is a polymerase or reverse transcriptase.

93.(new) The composition of claim 92, wherein the polymerizing agent is a polymerase or reverse transcriptase.

94.(new) The composition of claim 92, wherein the polymerase is selected from the group consisting of *Taq* DNA polymerase I, T7 DNA polymerase, Sequenase, and the Klenow fragment from *E. coli* DNA polymerase I.

95.(new) The composition of claim 93, wherein the reverse transcriptase comprises HIV-1 reverse transcriptase.

96.(new) The composition of claim 89, wherein each of the monomers comprises a deoxynucleotide triphosphate (dNTP) and the monomer tag is covalently bonded to the terminal phosphate group of each dNTP.

97.(new) The composition of claim 96, wherein the tags comprise fluorescent tags and the fluorescence property comprises an intensity and/or frequency of emitted fluorescent light.

98.(new) The composition of claim 97, wherein the fluorescence property is fluorescence resonance energy transfer (FRET) where either the monomer tag or the polymerase tag comprises a donor and the other tag comprises an acceptor and where FRET occurs when the two tags are in close proximity.

99.(new) The composition of claim 94, wherein the polymerase comprises *Taq* DNA polymerase I having a tag attached to an amino acid at a specific amino acid position of the *Taq* DNA polymerase I, where the amino acid position is selected from the group consisting of 513-518, 643, 647, 649 and 653-661 of SEQ. ID No. 11, where the tag comprises a fluorescent molecule.